
Test Procedure for

DETERMINING CONCRETE THICKNESS BY DIRECT MEASUREMENT



TxDOT Designation: Tex-423-A

Effective Date: May 2019

1. SCOPE

- 1.1 Use this method to determine concrete thickness and depth of reinforcing steel by direct measurement.
 - 1.1.1 Use Part I to determine the thickness of fresh hydraulic cement concrete pavement.
 - 1.1.2 Use Part II to determine the thickness of fresh hydraulic cement concrete bridge decks or culvert top slabs and to determine the depth of reinforcing steel in fresh hydraulic cement concrete bridge decks and culvert top slabs.
 - 1.2 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.
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PART I—DETERMINING THE THICKNESS OF FRESH HYDRAULIC CEMENT CONCRETE PAVEMENT

2. EQUIPMENT

- 2.1 **Depth rod.** A round, smooth, straight $5/8 \pm 1/16$ -in. (16 ± 2 -mm) diameter rod at least 6 in. (150 mm) greater in length than the thickness of the pavement to be measured, with both ends rounded to a hemispherical tip of the same diameter. The rod should be steel, high-density polyethylene, or other plastic of equal or greater abrasion resistance.
 - 2.2 **Measurement device.** A ruler, metal roll-up measuring tape, or similar rigid or semi-rigid length measuring instrument readable to the nearest $1/16$ in. (1 mm) or to the nearest 0.1 in. (2 mm).
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3. PROCEDURE

- 3.1 In a position perpendicular to the pavement surface, insert the depth rod into the concrete the full depth of the pavement and mark the top surface of the pavement on the rod.
 - 3.2 Retract the rod from the fresh concrete.
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- 3.3 With the measurement device, determine the depth of the pavement by measuring from the tip of the inserted end of the rod to the mark.
- 3.4 Record the location and the reading to the nearest 0.1 in. (2 mm).
- Note 1**—When using a scale readable to the nearest 0.1 in. (2 mm), measure to the nearest 0.1 in. (2 mm). When using a measurement device readable to the nearest 1/16 in. (1 mm), measure to the nearest 1/16 in. (1 mm) and round to the nearest 0.1 in. (2 mm), except in the case of 3/4 in. (19 mm), where the reading should be recorded as 0.75 in. (19 mm).

PART II—DETERMINING THE CONCRETE THICKNESS AND DEPTH OF REINFORCING STEEL IN FRESH HYDRAULIC CEMENT CONCRETE BRIDGE DECKS AND CULVERT TOP SLABS

4. EQUIPMENT

- 4.1 **Depth rod.** Steel, high-density polyethylene, or other plastic of equal or greater abrasion resistance, meeting one of the following descriptions:
- A round, smooth, straight $5/8 \pm 1/16$ -in. (16 ± 2 -mm) diameter rod at least 6 in. (150 mm) greater in length than the thickness of the pavement to be measured, with at least one end rounded to a hemispherical tip of the same diameter.
 - A flat bar no wider than 2 in.
 - A rod, thick wire, or other similar apparatus capable of insertion into the plastic concrete without bending.
- 4.2 **Reinforcing steel depth device.** A square steel or hard plastic trowel, thin plate, or other similarly rigid device at least 10 in. (254 mm) long and 4 in. (102 mm) high. A bent rod is enough, provided the bent leg is at least 10 in. (254 mm) long.
- 4.3 **Measurement device.** A ruler, metal roll-up measuring tape, or similar rigid or semi-rigid length measuring instrument readable to the nearest 1/16 in. (1 mm).

5. PROCEDURE

- 5.1 Take a minimum of three concrete thickness and steel depth readings per bay as shown in Figure 1. The total number of readings per span will depend on the width of the bridge. Direct the contractor to stop the screed, if necessary, at the locations shown, and take the readings at or behind the screed and before any evaporative retarder or cure is applied. Do not take measurements for depth over a beam or girder.

Note: The reading locations shown in Figure 1 are minimums. Additional readings at critical points where cover or concrete depth may be reduced, such as panel edges, cross-slope breaks, and transitions, may provide valuable information. While performing dry-run inspection, record the location and measurements of critical points and then verify cover and concrete depth during placement.

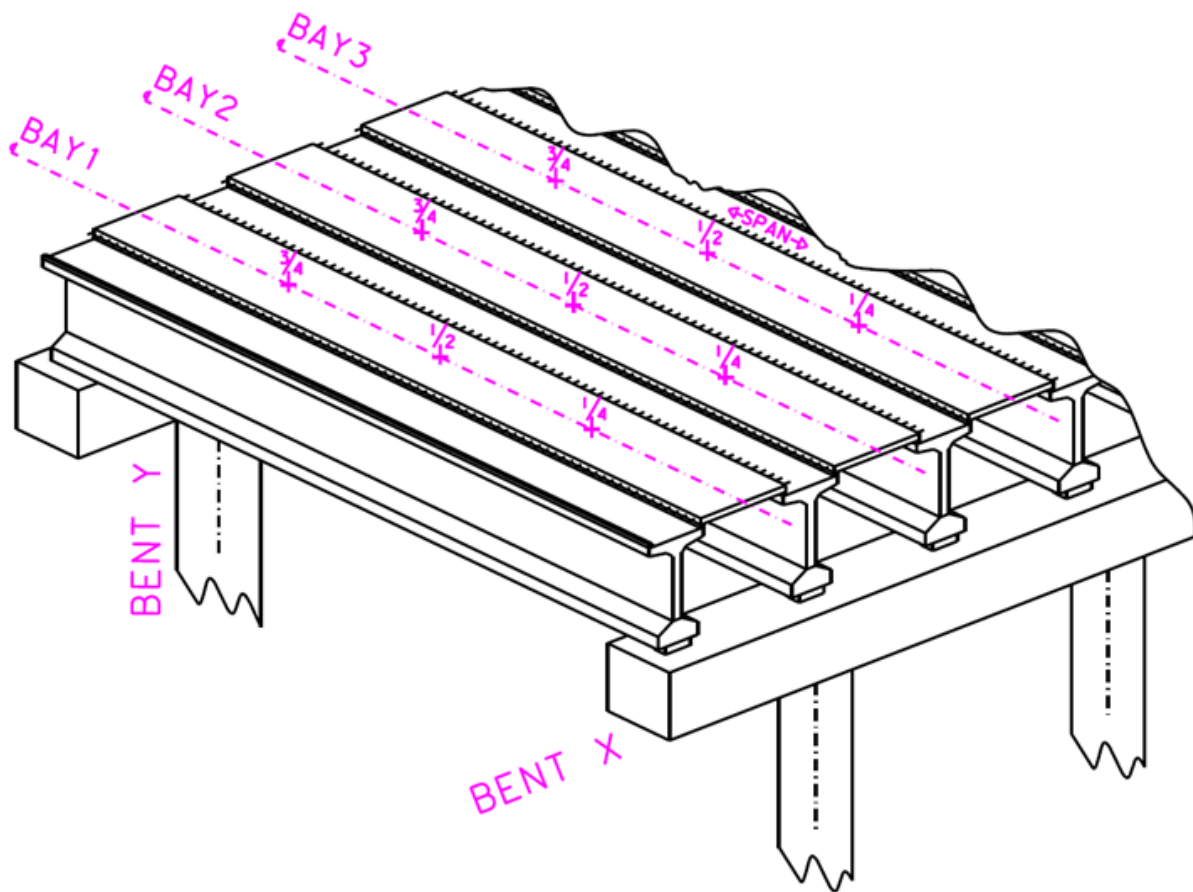


Figure 1—Slab Depth Check Locations per Span

5.2 Thickness Measurement:

- 5.2.1 In a position perpendicular to the concrete surface, insert the depth rod into the concrete the full depth of the deck or slab and mark the top surface of the concrete on the rod.
- 5.2.2 Retract the rod from the fresh concrete.
- 5.2.3 Using the measurement device, determine the thickness of the bridge deck or culvert slab by measuring from the tip of the inserted end of the rod to the mark.
- 5.2.4 Record the location and the readings to the nearest 1/16 in. (1 mm).

5.3 Reinforcing Steel Depth Measurement:

- 5.3.1 In a position perpendicular to the deck or slab surface, insert the reinforcing steel depth device into the concrete at a 90° angle to the highest level of reinforcing steel until it touches two adjacent reinforcing bars as shown in Figure 2. Mark the top surface of the concrete on the device.

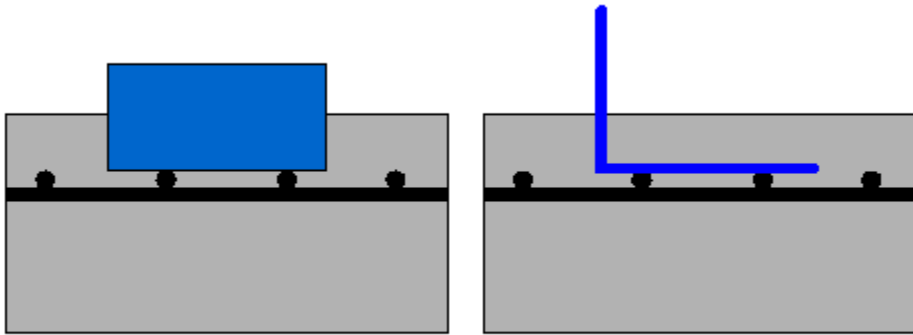


Figure 2—Inserting the Reinforcing Steel Depth Device

- 5.3.2 Retract the device from the fresh concrete.
- 5.3.3 Using the measurement device, determine the depth of the reinforcing steel by measuring from the tip of the inserted end of the device to the mark.
- 5.3.4 Record the location and the readings to the nearest 1/16 in.

6. ARCHIVED VERSIONS

- 6.1 Archived versions are available.